UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte C. BERTIL STROMBERG, AUVO K. KETTUNEN, JIAN E. JIANG and KAJ O. HENRICSON

Appeal No. 2004-1877
Application No. 09/178,512

ON BRIEF

Before KIMLIN, WALTZ and PAWLIKOWSKI, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-8 and 10-20. Claims 21-24, the other claims pending in the present application, have been withdrawn from consideration. Claim 1 is illustrative:

1. A method of treating comminuted cellulosic fibrous hardwood chip material to produce cellulose pulp, comprising:

(a) treating the hardwood chip material with a first alkaline liquid having a first effective alkali concentration and at a temperature less than 120°C;
(b) treating the hardwood chip material with a second alkaline liquid having a second effective alkali concentration by adding dilution liquor having a low or substantially zero alkali concentration, while

heating the hardwood chip material to a temperature above 120°C;

(c) treating the hardwood chip material with a third alkaline liquid having a third effective alkali concentration at a temperature greater than 140°C to delignify the material; and

(d) treating the hardwood chip material with a fourth liquid to cool the material to a temperature less than 120°C; wherein the first, second, third initial effective alkali concentrations are all less than 30 g/L, and wherein the second and third effective alkali concentrations are about 25 g/L or less.

The examiner relies upon the following references as evidence of obviousness:

Kettunen et al. (Kettunen)	5,635,026	Jun. 3, 1997
Chasse et al. (Chasse)	5,674,359	Oct. 7, 1997

P. Sandström et al. (Sandström), "Development of Modified Kraft Processes With a Mathematical Model for Continuous Digesters," 1 ACME Forest Products Division 31-42 (1986)

Appellants' claimed invention is directed to a method for producing cellulose pulp from comminuted fibrous hardwood chip material. The method entails treating the hardwood chip material with first, second and third alkaline liquids at increasing temperatures, i.e., first at less than 120°C, then at a temperature above 120°C, and finally at a temperature greater than 140°C. The treated chip material is then exposed to a fourth liquid which cools the material to a temperature less than

120°C. Also, the effective alkali concentrations of the three treatments are all less than 30 g/L.

Appealed claims 1-8 and 10-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chasse in view of Kettunen and, optionally, Sandström.

Appellants submit at page 3 of the Brief that "[c]laims 1-8 and 10-20 may be grouped together for purpose of this appeal." Accordingly, all the appealed claims stand or fall together with claim 1, and we will limit our consideration to the examiner's § 103 rejection of claim 1.

We have thoroughly reviewed each of appellants' arguments for patentability. However, we are in complete agreement with the examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the examiner's rejection for essentially those reasons expressed in the Answer, and we add the following primarily for emphasis.

Chasse, like appellants, is directed to a method of preparing cellulose pulp from comminuted cellulosic fibrous material by treating the fibrous material to successive alkali solutions at increasing temperatures. Chasse teaches that "strength losses can

be avoided by first ensuring that the wood, or other cellulose, is penetrated with a relatively cold alkali at the beginning of the impregnation" (column 1, lines 24-26). Chasse discloses that the first alkali treatment zone is at a temperature of 80°-110°C, which is within the claimed range of less than 120°C, and at an alkali concentration of about 5-30 g/L, which meets the claimed range of less than 30 g/L. The second treatment zone of Chasse is conducted at a temperature between about 110°-150°C and at an alkali concentration that is typically at least 5 g/L greater than the first treatment zone. It can be seen that the temperature and alkali concentration in Chasse's second treatment zone largely overlap the recited ranges for appellants' second treatment zone. Finally, Chasse cooks the cellulosic fibrous material at a temperature in the range of 150°-180°C, which meets the claim recitation of greater than 140°C (see column 1, lines 60-62). Although Chasse does not expressly disclose the level of alkali concentration in the cooking step, it is reasonable to conclude that the concentrations of less than 30 g/L present in the first two treatment zones would also prevail in the cooking zone. Significantly, appellants' specification discloses that it was conventional in the art for the alkali concentration to decline during the course of treatment such that the final concentration

"at the completion of the cook may approach 5 g/L or lower" (page 2 of specification, lines 10-11). Appellants' specification also discloses that work done by the Swedish research firm STFI employed an initial alkali concentration of 10-15 g/L and a concentration of 5-10 g/L at the end of the cook (see page 2 of specification, third paragraph). Hence, based on the state of the prior art, we are convinced that it would have been obvious for one of ordinary skill in the art to perform the treatment method of Chasse in accordance with the protocol recited in claim 1 on appeal.

Furthermore, we agree with the examiner that Sandström provides additional evidence that it was known in the art to use the low alkali concentrations in the three claimed treating steps in order to increase the delignification selectivity, increase the pulp strength and consume less bleaching chemicals. Sandström teaches that "[t]he difference in alkali concentration between the liquor in chips and the free liquor is descreased [sic] from 45 g/l to 5 g/l at the point of temperature increase (130°-170°C) at t=30 minutes" (page 34, second column, last sentence). Since Figure 7 of Sandstrōm illustrates that the alkali concentration at higher temperatures is well below 30 g/L, it follows that the alkali concentration of the free liquor is also kept below 30 g/L.

Also, as pointed out by the examiner, Figure 8 of Sandström also depicts alkali concentrations within the claimed range.

Appellants contend that "[t]he Sandström article deals with improving the pulp strength properties for *softwoods* with a kappa number of 32 being the desired kappa, while the applicants' invention is directed toward hardwoods" (page 3 of Brief, third paragraph). However, we agree with the examiner that Sandström's disclosure is not limited to softwoods but is generally applicable to methods of producing cellulose pulp from cellulosic fibrous material. Sandström's reference to softwoods with a kappa number of 32 is exemplary only.

Appellants have not refuted the examiner's finding that it would have been obvious for one of ordinary skill in the art to perform the claimed cooling step in the process of Chasse, particularly in light of Kettunen.

Appellants rely upon the Stromberg Declaration of March 4, 2002 as evidence of increased yield attributable to the claimed method. However, we agree with the examiner that the Declaration fails to establish that the 1% increase in yield would have been truly unexpected by one of ordinary skill in the art in light of the teachings of Chasse and Sandström. In re Merck & Co., 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir.

1986). We concur with the examiner that, based upon the teaching of Sandström and the state of the prior art, it would appear that the increase in yield achieved at low concentrations of alkali would have been expected by one of ordinary skill in the art. Just as unexpected results are evidence of nonobviousness, expected results are evidence of obviousness. In re Skoll, 523 F.2d 1392, 1397, 187 USPQ 481, 484 (CCPA 1975). Also, we agree with the examiner that the Declaration's use of an alkali concentration of 41.9 g/L is not a valid representation of Chasse, who fairly teaches concentrations as low as 10 g/L. Also, the examiner correctly points out that the declaration data is not truly comparative with respect to alkali concentration. For some unexplained reason, Profile D, representative of the prior art, is conducted at a higher cooking temperature than Profiles E and F of the present invention. In addition, the examiner lodges valid criticism that, inasmuch as Profiles E and F are at cooking temperatures of 146.9°-149°C, the evidence is not commensurate in scope with the degree of protection sought by the appealed claims which encompass temperatures greater than 140°C (claim 1) and 140°-180°C (claim 18). Indeed, appealed claim 1 places no upper limit on the cooking temperature.

Appellants acknowledge that it was known in the art that reduced alkali levels increase pulp yield, but appellants maintain that "the pulp quality will not obviously be such as to be useable" (page 10 of Brief, last paragraph). However, the examiner properly notes that both Chasse and Sandström disclose processes utilizing alkali concentrations within the claimed ranges which produce pulps having high strength.

In conclusion, based on the foregoing and the reasons well-stated by the examiner, the examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN Administrative Patent Judge	)	
THOMAS A. WALTZ Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
BEVERLY PAWLIKOWSKI Administrative Patent Judge	)	

ECK:clm

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